



Fish Farming and Integration of Women into the Social Fabric in Côte Divoire: The Case of the Municipality of Bingerville

Nanan Kouamé Félix kouadio*

Department of Geography, Peleforo Gon Coulibaly University, West Africa

***Corresponding author:** Nanan Kouamé Félix Kouadio, Department of Geography, Peleforo Gon Coulibaly University, West Africa.

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Abstract

In both Côte d'Ivoire and Africa, unlike men, women suffer from low levels of education. She is thus confronted with problems of integration into the social fabric due to her lack of education. Fish farming and related activities that do not necessarily require a high level of intellectual knowledge are an opportunity for them. This study aims at showing how fish farming contributes to the integration of women into the Ivorian social fabric, particularly in the municipality of Bingerville. The work method used is documentary research and field surveys conducted on fish farms and fish farm marketing sites identified in the study area. The results of our analyses reveal that fish farms initiated in lagoons and lowlands are a source of job creation for women. Some are employed as farm workers, technicians and administrative officers while others are involved in the trade of farmed fish. Thus, they enjoy relatively high financial incomes, allowing them to improve their living conditions and ensure their autonomy.

Keywords: Côte d'Ivoire; Bingerville; fish farming; social integration of women

Introduction

The integration of populations into the social fabric is a major problem for African States, particularly for Côte d'Ivoire. The women's class is more so because of its economic dependence and low purchasing power. According to the UNDP report, women constitute the majority of the poor population and face real difficulties in accessing education, health, employment and other economic opportunities. In general, women are divided between domestic work and child breeding in households. In Côte d'Ivoire, unemployment among women is higher than that of men. Then in 2016, data from the National Survey on the Employment Situation and the Informal Sector shows that the combined rate of unemployment, time-related underemployment and potential labour force is much higher for women (37.6%) than for men (20.2%). Their low level of education is one of the most plausible explanations. Fish farming and its induced activities, which do not necessarily require a high level of education [1], present

themselves as an opportunity for socio-economic integration for women. Indeed, according to N.K.F. Kouadio [2], fish farming in the municipality of Bingerville contributes to the supply of fish to the population, thanks to the relative presence of water resources useful for the development of fish farms. Thus, as in the distribution of fishery products, women are the main actors in the marketing chain of farmed fish [3]. In addition, they are also present in the fish production system, which provides them with a significant income [4]. The study questions the modes of social integration of women in relation to fish farming in the municipality of Bingerville. Its main question is: how does fish farming contribute to the integration of women into the social fabric of the municipality of Bingerville? The municipality of Bingerville is located in the District of Abidjan. Initially located 17 km east of the city of Abidjan (the country's economic capital), it is now less than 1 km from the latter (Figure 1).

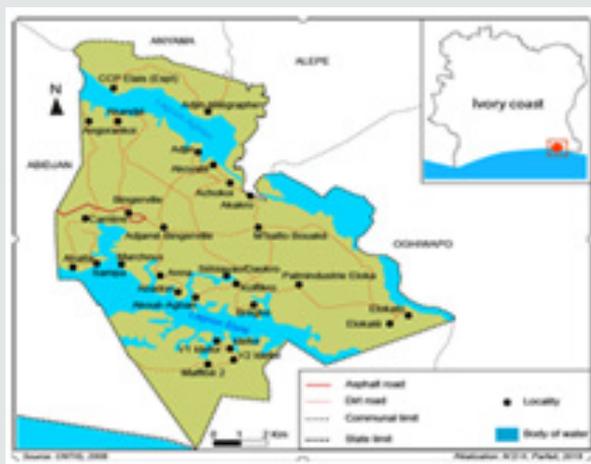


Figure 1: Location of the municipality of Bingerville.

Methodology

The working method adopted to answer the question asked by our study is based on two main techniques: documentary research and field research. In the documentary search, the analysis of the secondary writings in relation to the main themes of the topic was discussed. This applies in particular to work on natural fish production resources, aquaculture production, the socio-economic impact of fish farming, women’s living standards and the agricultural activities developed by women. The documents consulted are mainly theses, articles, books and reports from non-governmental organizations. Examples include the work of [1,3-5] and UNDP reports (2010-2017). This information was consulted as a matter of priority in university libraries and documentation

centres of Government departments involved in aquaculture production and the promotion of women’s gender in Côte d’Ivoire. The internet tool through social networks was also useful in this search for secondary information. Regarding field surveys, research was carried out particularly in aquaculture production sites occupied by women, either as owners or as agricultural workers or administrative agents. This research also concerned the places where fish products are marketed in order to understand the importance of women in the sector and to assess the impact of the activity on their standard of living. Given the irregularity of the phenomena to be described in our study area, we conducted an exhaustive survey of fish farms occupied by women and fish product distribution sites. The following (Table 1) provides an inventory of the surveyed population.

Table 1: Distribution of the surveyed population according to their roles in fish farming (Source: Surveys, 2019).

Position occupied	Survey population
Employed on fish farms	30
farmed fish traders	10
Service officers involved in managing aquaculture activities and promoting gender	5
Total	45

In total, we investigated 45 individuals retained in four farms and three farmed fish marketing sites visited. The observation units are fish farms and marketing sites for farmed fish. The field survey technique used is direct observation and questionnaire. The analytical variables are particularly the role of women in the fish production system and their income on farms, the marketing of farmed fish, the financial impact of sales of fish products, the use of income earned by women and the lifestyle of women in the fish farming trades. Interviews were also held with resource persons

involved in aquaculture services and gender promotion in Côte d’Ivoire. With the former, we discussed the ways in which women are recruited and their incomes. With the second category, the main focus was on strategies for the integration of women into the social fabric of Côte d’Ivoire.

The elaboration of the maps of this work was possible thanks to the Adobe illustrator software and the use of a digital camera. After entering the data into a computer, it was processed by Microsoft Office Excel 2007 software.

Results and Discussion

Description of the natural fish production systems in the municipality of Bingerville: the water resource

Like the entire eastern coast of Côte d'Ivoire, the municipality of Bingerville is full of water resources useful for fish farming activities. These are particularly Adjin Lagoon and the relatively regular lowlands that are suitable for the development of fish production structures (Figure 2). Adjin lagoon, which houses the lagoon farms in the municipality, is part of the Ebrié lagoon system, as shown in the previous figure. It is characterized by a surface salinity that is always less than 0,5 g.l-1. In 2012, N.K.F.F. Kouadio (p. 161) stated that this body of water was the most sought-after for deep-sea fish farming in the Ivorian coast. Indeed, its low salinity rate is better adapted to the breeding of Tilapia (S. Hem et al. p. 468), considered as the most accessible species by breeders and

the most in demand by consumers in the country. According to [2] there are 13 fish farms in the municipality of Bingerville, located in seven rural areas. There are two main categories of activity in this riding. There is a continental fish farm in the lowlands and a lagoon fish farm in the lagoon (Photos 1, 2). The availability of water in sufficient quantity and quality is the main condition for fish farming practices. Indeed, it is involved in all stages of production, from rearing to grow-out, as shown in the case of the African Society for the Production of Farmed Fish (SAPPE) in the following Figure 3.

According to the previous figure, the SAPPE breeding and pre-growing basins are fed by water from Adjin lagoon. This body of water, which in turn houses the grow-out cages (Photo 2), completes production in an environment that combines the natural evolution factors of fish species. The sizes of fish harvested here are relatively large and range from 300 to 600 grams.



Figure 2: Water resources and ground level of the municipality of Bingerville and the eastern coast of Côte d'Ivoire.



Photo 1: Ponds built in Achokoi lowlands in the municipality of Bingerville



Photo 2: Ponds built in Achokoi lowlands in the municipality of Bingerville

Fish production, a source of job creation for women in the municipality of Bingerville

Women employed in the fish production system: Unlike agricultural activities, particularly market gardening [5] there are few women who own livestock farms. [4] estimates their proportion in this field at 7.3% compared to 92.7% for men. This value has decreased slightly according to [6], who set the proportion of women at 4.27% nationally compared to 95.75% for men in 2018. This level of distribution is also noticeable in the aquaculture landscape of the municipality of Bingerville, where there is a lack of women as owners of fish farms. There are many explanations for this discrepancy. According to J.P. Assi-Kaudjhis (op.cit), fish farming is a male occupation. According to the author, the reasons for this lie in the difficulties women have in accessing aquaculture production factors such as land, credit, agricultural inputs, training and technology. Indeed, women have more difficulty mobilizing these resources than men [7]. In rural areas in particular, women are relegated to the background in economic and social decision-

making for the benefit of men. This is particularly the case in land issues where women's rights depend on those of men, particularly their spouses, who decide for them how to access production spaces. In terms of mobilizing investment capital, women still suffer from the problem of access to agricultural incomes useful for setting up fish farms. According to Ibid (2004) quoted by [4], in rural areas, the latter have less than 15% of agricultural income, which limits their ability to invest in fish farming in particular.

On the other hand, women are present as employees on farms. In the municipality of Bingerville, they are actors who count in the production system [8]. They are in the technical field as production managers, technicians and hatchery managers. They are also responsible for sorting, chipping or cleaning activities. In addition, they participate in administrative services such as sales, secretaries, cashiers or housewives (Photos 3, 4). (Table 2) below shows the distribution of women on fish farms according to their activities in the municipality of Bingerville.



Photo 3: A woman working in household tasks at A2P (African Farmed Fish Production) in the municipality of Bingerville.



Photo 4: Women in fish processing and packaging at SAPPE in the municipality of Bingerville.

Table 2: Distribution of women according to their activities on fish farms in the municipality of Bingerville

Activities of female employees in fish farms	Number	Rate (%)
Sales department	05	16,67
Secretary or cashier	09	30,00
Farm workers or housewives	10	33,33
Hatchery Management	06	20,00
Total	30	100

Source: Surveys, 2014

Women in the marketing of fish products: According to [2], fish production in the municipality of Bingerville follows two main routes. There is one where farmed fish leave production farms to reach consumers directly and another where species pass through marketing sites. Thus, when fish production is not marketed directly from farms, it passes through areas reserved for its distribution. Our surveys identified three major distribution areas for farmed fish in the municipality of Bingerville. This figure is slightly higher than the one proposed by [2], which set it at 02 in 2014. The points of sale identified are the crossroads of the Bingerville market, the northern entrance to this market and "Fé késsé" neighbourhood at the main entrance to the city of Bingerville. These areas are the drop points for almost all aquaculture production destined to supply the city of Bingerville and its surroundings. The most regular sales channel is made up of wholesalers and retailers. The former is more than 90% dominated by women according to our surveys. This category first receives the production before selling them to retailers, which are

also predominantly female (plus 95%). According to [2], retailers record consumer needs on the eve of each sale and pass them on to wholesalers. As a result, the quantity requested by the population is proportional to the quantity ordered by wholesalers from livestock farmers. This approach guarantees the sale and avoids losses to the fish merchants due to the putrefaction of non-marketed species [9].

The fish trade is a hot topic for the wholesale and retail traders who occupy the sales sites located in the city every working day of the week (Photos 5, 6). The landing of farmed fish is generally made between 7am and 8am in the morning in the various marketing sites. The previous images illustrate the case of the distribution area at the Bingerville market hub where we see women wholesalers unloading their orders and sorting cash according to size. The production visible on these different images comes essentially from HYDROFISH farm. This establishment transports fish to the distribution areas using a van as shown in Photo 5 above.



Photo 5: Unloading of farmed fish at the crossroads of Bingerville market.



Photo 6: Sorting fish before weighing by a female wholesaler trader.

Significant income from fish farming activities by women

Direct income linked to the activity: Like other activities in the secondary and tertiary sectors, fish farming contributes to job creation. [1], estimates the number of direct jobs created by fish farming in Côte d'Ivoire at 2,067. Women occupy a significant place in this proportion. The activity thus constitutes an income opportunity for them. According to [4], fish farmers in Côte d'Ivoire would earn 47,888 F CFA/tonne in the west of the country, 43,889 F CFA/tonne in the central west and 26,062 F CFA/tonne in the east. According to the same author, these incomes would be much higher than those of farms, which would range from CFAF 17,929 per tonne for coffee to CFAF 24,981 per tonne for plantain bananas. On the other hand, the FAO (February-March 1980) indicates that for farms in rural areas with an area of 2 to 4 acres (200 to 400 m²), fish farmers' earnings reached 22,000 CFA F/month in the south, allowing farmers to provide a monthly wage for workers ranging from 13,000 to 64,000 CFA F.

The financial benefits previously presented by J.P. Assi-Kaudjhis (op. cit.) and the FAO more or less coincide and overlap with those identified in the municipality of Bingerville for small semi-

industrial farms. However, in large industrial and super-industrial farms such as SAPPE and HYDROFISH, which have a turnover of several million per month (for regular production), the earnings of employees, particularly women, are higher than in the cases initially mentioned. According to our surveys, workers in these structures, especially women, were paid between 50,000 and 100,000 CFA francs per month depending on their different tasks. In addition, they enjoyed a certain amount of fish every week or even every day, for their daily pittances.

Indirect income from fish farming: The importance of the financial benefits of fish farming for women lies mainly in the indirect activities, particularly the marketing of fish products. Indeed, fish plays an undeniable nutritional role in Côte d'Ivoire and is the most consumed source of protein by its population. Thus, in parallel with population growth, its demand at the national level and in Bingerville in particular continues to grow. One of the sources preferred by consumers in their quest for fish protein in the municipality of Bingerville is farmed fish [2]. The following (Photos 7, 8) are illustrations of the interest of the populations in livestock products. The selling price of fish varies according to size

and species. It evolves between 1 500 and 2 100 FCFA for carp, 1 200 FCFA for catfish and 2 100 FCFA for Machoiron according to our surveys. Thus, as mentioned in the previous points, women, who constitute the main actors in the distribution system, enjoy relatively high incomes. As shown in the previous photos, there is a popular interest in fish products in the municipality of Bingerville. Thus, in the face of this high demand, the female fish traders easily sell their fish stocks. In Table 3, we present the trade accounts of a few female fish traders located at the crossroads of Bingerville market. The analysis of the previous table shows that women fish

traders earn significant income in the municipality of Bingerville every day they sell. These financial benefits are the result of collaboration between them and large industrial farms such as HYDROFISH and SAPPE. Indeed, the promoters of these farms build loyalty with the wholesalers and sell their products on credit, the repayment of which follows an after-sales schedule. Thus, for every kilogram of fish sold, women traders earn 100 CFA francs. On this basis, the income derived for the selected persons ranges from CFAF 9,000 to CFAF 55,000 included per day, after the withdrawal of the expenses incurred.

Table 3: Daily trading account of four identified wholesale female fish traders (Source: Surveys, 2014, 2019).

Female fish traders	marketed stock (kg)	Total selling price of the stock	Revenues from partner farms (HYDROFISH and SAPPE)	Earnings of female fish traders due to 100 CFA francs / kg sold		
				Revenues earned (FCFA)	Expenses incurred (FCFA)	Profits (FCFA)
1	600	450 000	390 000	60 000	5 000	55 000
2	100	75 000	65 000	10 000	1 000	09 000
3	120	90 000	78 000	12 000	1 500	10 500
4	180	135 000	117 000	18 000	1 500	16 500
Total	1000 kg	750 000	650 000	100 000	9 000	91 000



Photo 7: Distribution of farmed fish to retailers in the municipality of Bingerville.



Photo 8: Distribution of farmed fish to consumers in the municipality of Bingerville.

Fish farming: an improvement in women’s living conditions

A source of available animal protein in households: In urban areas in particular, where access to food products remains dependent on financial means, women’s direct or indirect presence in the fish farming sector is an advantage for them in their quest for food security. Indeed, their presence as employees on livestock farms allows them to enjoy a significant quantity of fish for their own consumption free of charge. In all the farms visited in the municipality, fish farm promoters donate fish to all their workers, including women, free of charge at each production period (for irregular production) and every day (for regular production). The volume distributed varies according to farms, species and level of activity. In HYDROFISH, for example, each worker was entitled to 1 kg of tilapia per day. Fish farming also contributes to improving the food supply of women fish traders. Among the female fish traders visited, the majority of fishing needs are covered by fish farming. Indeed, thanks to their activities, these women obtain fish at wholesale prices and often take advantage of producers’ donations in recognition of their loyalty, to obtain its fish proteins free of charge. In Africa and particularly in Côte d’Ivoire, where women are generally responsible for the family (UNDP Report 2010-2017 p. 25), women need to find additional resources to ensure the daily subsistence of the household. Thus, these opportunities offered by

fish farming guarantee them a part of the financial needs that go into family food and therefore strengthen their purchasing power for the other consumption factors of their different families.

Poverty reduction, social equity and financial autonomy of women in relation to fish farming activities: Fish farming activities have an impact on reducing women’s poverty in the municipality of Bingerville. Today, despite the relative economic growth experienced by Côte d’Ivoire since 2012 (9% on average annually), the level of poverty remains very high (46.3% in 2015 compared to 48.9% in 2008). This poverty affects women with a rate of 47.4% compared to 45.5% for men in rural areas. In urban areas, this proportion reaches 56.8% compared to 35.9% (UNDP Report 2010-2017 p. 17). The creation of direct and indirect jobs resulting from aquaculture activities contributes to the fight against poverty among women and is thus a means of reducing these gaps. Indeed, the importance of the incomes presented above allows the women to ensure a relative well-being. According to our surveys, they are able to treat themselves properly and respect an average of two meals a day; this was not always the case for some of the women interviewed, who had to seek help to meet these needs. In addition, although they have children although not all of them are married (Table 4), they send them to school thanks to income from fish farming activities.

Table 4: Distribution of women involved in fish farming jobs according to their number of children (Source: Surveys, 2014, 2019).

	Number of children			Total
	0	1	2 et plus	
Employed in fish farms	4	7	19	30
Farmed fish female traders	0	0	10	10
Total	4	8	29	40

The analysis of the previous table shows that of the 40 women surveyed in the field of fish farming activities, 37 have at least 01 child and 29 have at least two children. According to these data, of the 37 women with at least one child, only 17 are married or

concubine. The remaining 20 maintain and educate their children according to their own resources, particularly those derived from fish farming activities, as mentioned above.

Table 5: Distribution of women involved in jobs directly or indirectly related to fish farming according to their marital status (Source: Surveys, 2014, 2019).

	Married	Single	Divorced	Concubine	Total
Employed on fish farms	4	15	2	9	30
Farmed fish female traders	0	6	0	4	10
Total	4	21	2	13	40

Fish farming activities also contribute to social equity. Indeed, even if efforts to promote gender are made, we are still far from gender equality. The lack of a secure income is likely to contribute to increasing women's vulnerability. Thus, in the majority of cases, it has a secondary intervention in decision-making. Her direct or indirect involvement in fish farming gives her a brighter image and consideration in society along with the relatively acceptable income she receives from it, which stabilizes her life. Women working in fish farming related jobs in the municipality of Bingerville have become autonomous. Many of them are single, as shown in Table 5 below. According to our surveys, out of 40 women surveyed, 21 are single, representing a rate of 52.5% of cases. Of the 21 registered singles, 15 are employed on fish farms (71.42% of cases) and 06 are involved in the fish trade (28.57% of cases). In addition, 02 of the 40 women surveyed are divorced, particularly in the rank of employees on fish farms. However, regardless of their marital status, women in the fish farming jobs have become economically self-sufficient and earn a decent living. Fish farming as an income generating activity allows them to support themselves and their families.

Conclusion

The results of our study confirm the role played by fish farming in the integration of women into the social fabric of the municipality of Bingerville. The factors for this inclusion are multiple. These are particularly direct and indirect jobs created by the activity, with the main consequences being income opportunities, the use of which contributes to improving living conditions and women's autonomy. However, women working in this sector need support to maintain themselves in these activities on a sustainable basis. The informal nature of the majority of farms (on which they operate) and livestock businesses compromises the sustainability of the socio-economic opportunities available to them. In addition, the precarious conditions in which fish are managed and distributed expose them to the risk of disease. The study of women's integration patterns in relation to fish farming is rich in teaching in the field

of the benefits of aquaculture in general. However, we recommend further research on the problems faced by producers and traders of farmed fish, particularly women.

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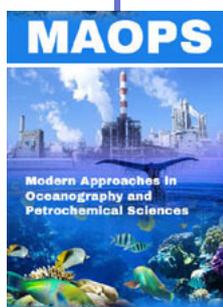
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